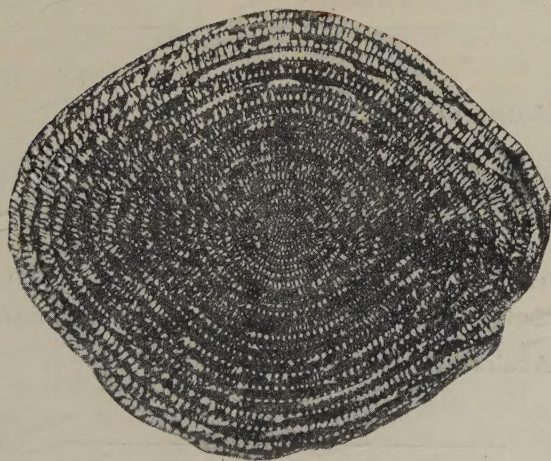


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CONTENTS

TRANSACTIONS

263. <i>Isogramma paotekhowensis</i> (GRABAU et CHAO) from the Permian of Japan	Masao MINATO	29
264. Tertiary Mollusca from Taishu Mine, Tsushima, Nagasaki Prefecture, Japan	Saburo KANNO	31
265. Evolution of Peroniceratidae	Tatsuro MATSUMOTO	37
266. <i>Hidaella</i> , a new genus of the Pennsylvanian fusulinids from the Fukui district, eastern part of the Hida mountainland, Central Japan	Haruyoshi FUJIMOTO and Hisayoshi IGO	45
267. <i>Spirosigmoilinella</i> , a new foraminiferal genus from the Miocene of Japan	Takashi MATSUNAGA	49
PUBLICATIONS RECEIVED (9).....		51
PROCEEDINGS		51

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 PALAEONTOLOGICAL SOCIETY OF JAPAN
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263. *ISOGRAMMA PAOTECHOWENSIS* (GRABAU ET CHAO)
FROM THE PERMIAN OF JAPAN*

MASAO MINATO

Hokkaido University, Sapporo

Isogramma paotechowensis (GRABAU et CHAO) 日本の二疊紀層に産す： 前川俊治は宮城県本吉郡月立村細尾沢で腕足類化石を採集したが、その中に表記の種がふくまれていた。不完全な標本ではあるがいちおうの記載を行つた。本種は従来、石炭紀層産として報告されてきたが、その時代は二疊紀に訂正さるべきものである。 湊 正雄

Isogramma paotechowensis (GRABAU et CHAO) is a brachiopod characterized by its large size, semi-circular shell form and quite unusual ornamentation of shell surface.

Very lately this species was discovered for the first time in Japan by S. MAEKAWA at Hoso-o-zawa, Tukitate-mura, Motoyoshi-gun, Miyagi Prefecture. The geological horizon of this occurrence is the Lower Kanokura series¹⁾ of the Kitakami mountains, and is doubtlessly Permian in age.

The writer is grateful to Mr. S. MAEKAWA for his courtesy in submitting his specimen for study to the present writer.

Isogramma paotechowensis
(GRABAU et CHAO)

Text-fig. 1

1928. *Aulacorhynchus paotechowensis*, GRABAU et CHAO: Productidae of China, 2, *Palaeont. Sinica*, Ser. B, vol. V, fasc. III, p. 33, pl. 1, figs. 1-5.

1931. *Isogramma paotechowensis*, AIGNER und HERITSCH: Das Genus *Isogramma* im Carbon der Südalpen. *Denkschriften d. Akad. Wissenschaften Wien, Mathem.-Nat. Wiss. Klasse*, 102, p. 307, pl. 2, figs. 32-36; pl. 3, figs. 37-44; pl. 4, figs. 45-51; pl. 5, figs. 52, 53, 67, 71.

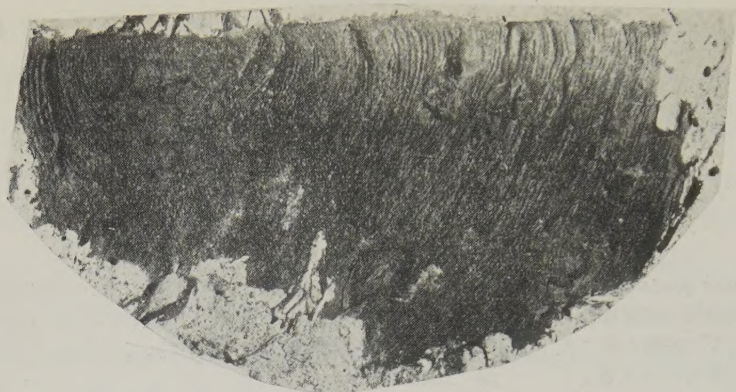
1935. *Isogramma paotechowensis*, METZ: Eine Fauna aus den untersten Schichten des Obercarbons der Karnischen Alpen. *N. Jb. f. Min. usw. Beil. Bd. 75, Abt. B*, p. 171, pl. 5, fig. 17.

Shell attaining quite a large size, transversely semicircular in outline. Both cardinal and frontal margins of the shell are torn off, but width of shell is estimated to be nearly twice the length; namely, it is 128 mm wide, while it is assumed to be about 64 mm in length. Hinge-line is straight, probably equaling the greatest width of shell, or possibly only slightly shorter. Shell is slightly concave around umbonal region, but is otherwise almost flat.

Cardinal area distinct, about 3 mm high at umbonal region, gradually lowering toward cardinal extremities. On cardinal area, external surface sculpture is impressed, which consists of minute punctures with indistinct vertical striae here and there.

Numerous, sharply raised concentric lirae decorate whole shell surface which are almost parallel everywhere to the shell margins, and alternating with rather flattish concave furrows of almost equal width. In these flat-bottomed furrows very numerous punctures are observed that are generally arranged in

* Read Oct. 1954; received Nov. 2, 1954



Text-fig. 1. *Isogramma paotchowensis* (GRABAU et CHAO) $\times 1$. Phot.: S. KUMANO

four rows along concentric lirae.

No internal structure observable, because the specimen is preserved as a mold of an external surface of the shell.

Remarks:—With regard the general outer form, size and sculpture, the specimen under consideration is doubtlessly conspecific with *Isogramma paotchowensis*, described by CHAO, AIGNER and HERITSCH and also by METZ. Formerly CHAO claimed the dorsal valve of this species to lack cardinal area, however, it is not true; AIGNER and HERITSCH recognized its presence and illustrated in many figures. The presence of the cardinal area in the dorsal valve is also ascertained in the Kitakami specimen as above described.

This species was once believed to represent the Upper Carboniferous but not the Permian. However, all of CHAO's specimens were said to have been derived from the Taiyuan formation of North China, so that the age of this species must be now regarded Lower Permian; furthermore, AIGNER and HERITSCH described this species from the Cora-formation in the Carnic Alps, and accordingly the geological age of this species can not but be Permian.

Besides, the age of the so-called

Waideggerfauna (the so-called Upper Carboniferous fauna) in association with *Isogramma paotchowensis* described by METZ from the Carnic Alps is also of the Permian age.

The Kitakami specimen also is Permian, and especially the Early Middle Permian in age, being found in association with *Productus gratosus*, *Linoproductus cora*, *Derbyia grandis*, *Marginitifera longispinus*, *Spiriferina cristata*, etc. Thus, the occurrence wholly coincides with that of the Waideggerfauna in the Carnic Alps. All the associate species of *Isogramma* in the Kitakami Mountains were also found by METZ in his Waideggerfauna in the Carnic Alps.

Loc.:—Hoso-o-zawa, Tsukitate-mura, Motoyoshi-gun, Miyagi Prefecture.

Horizon:—Lower Kanokura Series. *Coll.*: S. MAEKAWA. *Reg. no.*: 17838. Department Geol. & Min. Hokkaido Univ. Sapporo.

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264. TERTIARY MOLLUSCA FROM TAISHU MINE, TSUSHIMA, NAGASAKI PREFECTURE, JAPAN*

SABURO KANNO

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対馬, 対州鉱山産介化石について: 対馬の対州鉱山から採集された介化石群を検討した結果 14 種を同定した。その結果これら介化石群を含む地層は今迄考えられていたよりも若く漸新世後期または中新世初期のものであることを指摘した。菅野三郎

Introduction

Through the kindness of Mr. I. SAGA, geologist of the Toho-Aen Company, the writer had a chance to study the molluscan fossils collected from the Taishu Mine in Sasu-mura, Tsushima Island, Nagasaki Prefecture, Japan.

With regard to the geology of the island, there are three reports, namely, by T. NAGA (1891), D. SATO (1908) and I. TATEIWA (1934). T. NAGA pointed out that the island consists essentially of disturbed alternating beds of shale and sandstone intruded in places by granite, quartz-porphyry, porphyrite etc. These rocks, he stated, show resemblance to the Jurassic series of Central Japan. However, he found no fossils. D. SATO divided the strata into Lower and Upper. The former occupies the northwestern part of Kami-shima and the latter the remaining part of the island. Their boundary extends northwesterly from Waniura to Inugaura. From lithologic similarity, he compared the beds with the Mesozoic rocks of southwestern Japan, and with those of south Korea. Although he recorded the occurrence of the molluscan and plant remains, no definite age was

ascribed because of their bad preservation. I. TATEIWA collected a small flora from a dark grey shale exposed on a roadside cutting near the village of Kotsuki in Shimo-jima and from a similar shale near the entrance to the village of Saka in Kami-shima. From the flora which comprises 16 forms of plant leaves, he determined its geological age to be Cretaceous-Paleogene.

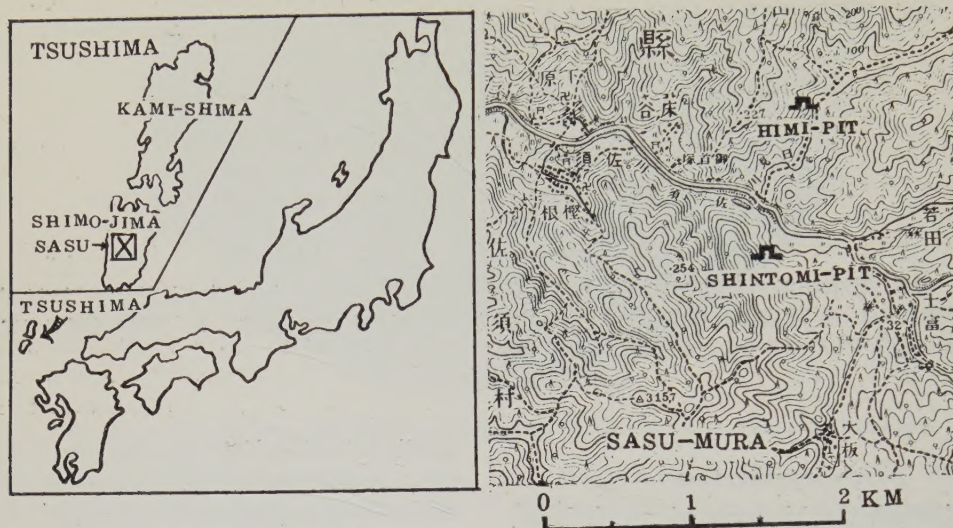
Such being the state of our previous knowledge on the geologic age of these beds, the present fauna is considered to have important bearing on the problem.

The writer wishes to express his gratitude to Mr. I. SAGA, geologist of the Toho-Aen Company, for kindly offering his collection for examination and for oral information concerning their geological occurrence, and to Drs. Haruyoshi FUJIMOTO and Kotora HATAI, both of our Institute, for their constant guidance during the course of the present work.

Fossil localities and occurrence

The Taishu group (TATEIWA, 1934), generally speaking, is an alternation of dark grey sandstone and black or dark grey slaty shale, each having a thickness of about 10 cm. And there often is a ripple mark between the sandstone and the shale.

* Read. Oct. 9, 1954; received Nov. 7, 1954



Text-fig. 1. Maps showing the locality.

So far to date, fossils have been hardly reported from Tsushima excepting plant and a few fragmental molluscan fossils. However, molluscan fossils were discovered in 1953 by I. SAGA from in the Shintomi-pit and Himi-pit of the Taishu Mine (Text-fig. 1). The fossils were derived from a one meter thick shale intercalated in the alternation of sandstone and shale. The shale, although massive, appears as a breccia in containing a number of angular pumice, quartz-porphry and porphyrite.

The 14 species which are each represented by only one or several individuals were obtained from the Shintomi-pit. The shells are rather well preserved but are impregnated with pyrite in part.

The distinguished forms are:

1. *Acila* (s.s.) sp. A single fragment.
2. *Nucula* (*Lamellinucula*) cf. *hizenensis* NAGAO Pl. 6, Fig. 1.
A single fractured specimen.
3. *Anadara* sp. A single fragmentary specimen Pl. 6, Fig. 2.
4. *Chlamys* (*Coralichlamys*?) cf. *rutteni*

MARTIN

5. *Patinopecten kimurai* (YOKOYAMA)
6. *Cyrena* aff. *mirabilis* NAGAO ... Pl. 6, Fig. 9.
A single specimen.
7. *Lucinoma* sp. A single fragmentary specimen..... Pl. 6, Fig. 10.
8. *Venericardia* cf. *yoshidai* NAGAO.....Pl. 6, Fig. 11.
9. *Meretrix* aff. *pseudomeretrix* NAGAO.....Pl. 6, Fig. 12.
A single specimen.
10. *Dosinia* cf. *chikuzenensis* NAGAO
11. *Tellina* sp.
12. *Phaxus* aff. *izumoensis* (YOKOYAMA)
13. *Euspira* cf. *ashiyaensis* (NAGAO).....Pl. 6, Fig. 17.
Ill preserved specimen.
14. *Neverita insignis* (NAGAO) A single specimen..... Pl. 6, Figs. 18a-b

Geologic age of the Taishu fauna

T. Nasa (1891) considered the beds in question to be Jurassic in age from their lithologic resemblance to the Jurassic strata of Central Japan. D. SATO (1908) claimed them to of Mesozoic

because of their lithologic resemblance with the Mesozoic rocks of Nagato, southwestern Japan, and with those of south Korea. However, I. TATEIWA (1934) pointed out that the beds, from their plant fossils and stratigraphic consideration, are of Cretaceo-Paleogene age. So far as the flora is concerned, a Lower Tertiary age seems possible, but he was inclined to regard the beds are rather old owing to the stratigraphic relation of them to the rocks that intruded beds. These intrusive rocks are probably contemporaneous with the eruptive rocks of the Bukkokuji group of south Korea, whose eroded surface is covered by the Choki series which contains a Paleogene flora of the so-called Arctic Miocene type.

The present molluscan fauna, although inadequate for discussing the chronological age, is important in that there is no evidence for a Cretaceous age. The molluscan fauna is similar to that of the Paleogene Ashiya group in northern Kyushu, Japan. However, *Patinopecten kimurai* (YOKOYAMA) and the genus *Dosinia* are dominant elements in the early half of the Miocene in Japan. The plant fossils reported by TATEIWA seems to be of Tertiary age. Therefore, the writer concludes that the geological age is late Paleogene or early Miocene. However, it must be kept in mind that the age is restricted to the fossiliferous beds and not to be the whole. Therefore, it may be added that detailed stratigraphic work is necessary to clear the problem existing between the fossiliferous beds to the geology of the island.

Systematic Description

Family Pectinidae

Genus *Chlamys* RÖDING, 1798

Chlamys (*Coralichlamys*?) cf. *rutteni*

MARTIN, 1914

Plate 6, Fig. 3

1952. *Chlamys* (*Coralichlamys*?) *rutteni* MIZUNO, *Trans. Proc. Palaeont. Soc., Japan (N.S.)*, no. 6, pp. 188-189, pl. 17, fig. 6.

A single right valve. It is broken at its umbonal and postero-dorsal parts, and measures 6.0mm in length and 6.4mm in height. This specimen has a small shell and more than twenty narrow radial ribs which are separated by broader interspaces.

Genus *Patinopecten* DALL, 1898

Patinopecten kimurai (YOKOYAMA), 1925

Plate 6, Figs. 4-8

1925. *Pecten kimurai* YOKOYAMA, *Jour. Coll. Sci., Imp. Univ. Tokyo*, vol. 45, art. 5, p. 27, pl. 4, figs. 1-6, pl. 2, fig. 4.

Shell large, orbicular, more or less compressed, subequilateral, the antero-dorsal margin being slightly longer than the posterodorsal. Surface with radial ribs. Right valve with eight radiating ribs with no longitudinal riblets or striae on their backs, separated by shallow valleys of about equal breadth which are smooth at bottom and show no demarcation against the ribs. Ears subequal, the anterior one smaller, triangular in outline with its anterior border somewhat convex; byssal notch hardly developed; posterior ear also triangular but gently curved from the hinge-line to the posterior border. Isolated left valves which probably belong to the same species are less convex, provided with fine network, granular ornamentation and radial ribs; ribs about eight in number, roof-like, sharp, with valleys

equally formed, that is to say broadly V-shaped; ears subequal, triangular, provided with a few radiating riblets. Hinge-line nearly straight but oblique. The largest specimen (fig. 4) is 81 mm in height, about 80 mm in length and 36 mm in length of hinge-line while another (fig. 5) measures 20 mm in height, 20.5 mm in length and 9 mm in length of hinge-line.

Remarks :—The specimens resemble *Patinopecten kimurai* (YOKOYAMA) (1925) from the Jo-Ban Coal-field, but diverge therefrom by having no radial striae on the ribs of the right valve, and more elevated and rigid ribs. *P. murayamai* (YOKOYAMA) (1926), is also similar but is distinguishable by having equilateral valves, and in having the right and left valves nearly equal. *P. kimurai ugoensis* HATAI and NISIYAMA (1940) differs by having subequal valves, no strong radial ribs and smaller shells. *P. kimurai tiganouraensis* NAKAMURA (1940) is distinguishable by having a less number of ribs which are gently elevated and broadly rounded. *P. kyushuensis* (NAGAO) (1928) from the Paleogene of Kyushu, Japan, is somewhat akin but has numerous ribs. Therefore, the present specimens may represent a new form. However, the state of preservation does not permit establishing a new name.

Family Veneridae

Genus *Dosinia* SCOPOLI, 1777

Dosinia cf. *chikuzenensis* NAGAO, 1928

Plate 6, Fig. 13.

1928. *Dosinia chikuzenensis* NAGAO, *Sci. Rep., Tohoku Imp. Univ., 2nd ser., vol. 12, no. 1*, p. 64 (54), pl. 10, figs. 4-7, 9.

Although the single specimen at hand

is more or less compressed, it resembles the paratype (fig. 14) of the named species figured by NAGAO from northern Kyushu, Japan. Dimensions: 39.8 mm in length, 38.1 mm in height.

Family Tellinidae

Genus *Tellina* LINNÉ, 1758

Tellina sp. indet.

Plate 6, Fig. 15.

Shell of moderate size, compressed, transversely elongate-ovate in outline. Antero-dorsal margin fairly arched, postero-dorsal margin straight with an indistinct excavation behind the umbo, and forming an angle of about 145° with the antero-dorsal. Anterior end evenly rounded, the posterior one rostrate and subtruncate; ventral margin broadly arcuate. Umbo small, pointed, inconspicuous. Surface with crowded, narrow and incremental concentric lines. Test thin. Hinge plate and teeth unknown.

Dimension :—34 mm in height and 54 mm in length.

Remarks :—The single left valve is somewhat similar to *T. maxima* NAGAO (1928), but differs by having a more compressed shell, more rounded anterior end and rostrate posterior end. It is also similar to the *T.* sp. figured by NAGAO (1928) from the Kiuragi Mine, northern Kyushu, Japan. Since the Kiuragi specimens are both right valves, precise comparison between these two forms is difficult, but the writer holds the view that these two forms may prove to be the same specimens.

Family Glauconomidae

Genus *Phaxus* LEACH, 1852

Phaxus aff. *izumoensis*

(YOKOYAMA), 1923

Plate 6, Fig. 16.

1923. *Cultellus izumoensis* YOKOYAMA, Japan. *Jour. Geol. Geogr.*, vol. 2, p. 5, pl. 2, fig. 1.
1925. *Cultellus izumoensis* YOKOYAMA, *Jour. Coll. Sci., Tokyo Imp. Univ.*, vol. 45, art. 6, p. 18, pl. 5, figs. 2, 3.
1928. *Cultellus izumoensis* NAGAO, *Sci. Rep., Tohoku Imp. Univ.*, 2nd ser., vol. 12, no. 1, p. 82 (75), pl. 4, figs. 1-4.

One specimen. It resembles *Cultellus* sp. aff. *C. izumoensis* YOKOYAMA, figured by NAGAO (1928) from the Paleogene formation of Kyushu. However, our specimen is not well preserved and is represented by an external mould. Therefore a more precise comparison with NAGAO's specimens is rendered difficult.

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Explanation of Plate 6

(All figures in natural size unless otherwise stated)

- Fig. 1. *Nucula (Lamelinucula) cf. hizenensis* (NAGAO) $\times 3$
Fig. 2. *Anadara* sp.
Fig. 3. *Chlamys (Coralichlamys?) cf. rutteni* MARTIN $\times 5$
Figs. 4-8. *Patinopecten kimurai* (YOKOYAMA)
Figs. 4-6, Right valve. Figs. 7, 8, Left valve.
Figs. 5-8, Plastotype.
Fig. 6. Deformed specimen.
Fig. 9. *Cyrena* aff. *mirabilis* NAGAO $\times 3$
Fig. 10. *Lucinoma* sp.
Fig. 11. *Venericardia* cf. *yoshidai* NAGAO. (Cast)
Fig. 12. *Meretrix* aff. *pseudomeretrix* NAGAO $\times 3$
Fig. 13. *Dosinia* cf. *chikuzenensis* NAGAO
Fig. 14. *Dosinia chikuzenensis* NAGAO. A paratype figured by NAGAO from Chikuzen, northern Kyushu, Japan. $\times 0.8$
Fig. 15. *Tellina* sp.
Fig. 16. *Phaxus* aff. *izumoensis* (YOKOYAMA), Plastotype
Fig. 17. *Euspira* cf. *ashiyaensis* (NAGAO)
Fig. 18. *Neverita insignis* (NAGAO)



265. EVOLUTION OF PERONICERATIDAE *

TATSURO MATSUMOTO

Department of Geology, Kyushu University

Peroniceratidae の進化: Senonian の重要な菊石科 Peroniceratidae については, COLLIGNON (1948) の包括的なすぐれた研究がある。しかし氏の体系は日本のものにはよくあてはまらない点がある。この事実には端緒を得て, さらに外国種について検討した結果, 新しい分類系統が得られた。本科の起源については, Collignoniceratidae の *Subprionocyclus* (Turonian) と密接に結びつく一群を認め, 新属 *Protexanites* を提唱した。これは *Texanites* を導く。日本種のうち, *amakusense* = *fukazawai* と *nomii* は *Protexanites* の後期型のもので, アフリカの *T. soutoni* (第3図) (両属の中間型) に近い。*orientale* はアフリカの *umkwelanense* (第2図) とともに *Paratexanites* で, *Parabevahites* (ついで *Bevahites*) を導き, これらは *Protexanites*-*Texanites* 系とは平行的である (第1図参照)。本科は Coniacian に急激に分化し, 主な諸属が発達し, 以降漸進し, Campanian 中頃に局部的の更新がある。以上の進化史は本文第1表に要約される。 松本達郎

Foreword

While I was studying the Cretaceous ammonites of Japan and South Saghalien, General M. COLLIGNON (1948, a,b) published a magnificent monograph on the "Texanitidae" of Madagascar and gave a review on the Japanese forms in the appendix of that paper. Indeed his work is comprehensive and has much advanced our knowledge, but I cannot agree with him in some of his remarks on the Japanese forms. With a doubt kept in my mind I visited London in 1953-54 where I fortunately had an opportunity to study some foreign specimens. As a result of the study I have obtained a new idea which is not only satisfactorily applicable to the Japanese forms in question but also interesting to the problem of the evolution of Pero-

niceratidae, one of the important ammonite families in the Upper Cretaceous.

As to that problem Mr. C.W. WRIGHT expressed his opinion (1952, p. 221 and fig. 2) that Peroniceratidae HYATT, 1900 (=Texanitidae COLLIGNON, 1948) has its origin in some Collignoniceratidae WRIGHT & WRIGHT, 1951 (=Prionotropidae HYATT, 1900), through *Gauthiericeras*. This might be a possible source but in my opinion there is another alternative which seems better for at least some of the members of Peroniceratidae.

As I intend to monograph the Japanese Peroniceratidae at some later opportunity I present here concisely the facts which I have noticed and an opinion which can be developed from them.

I should like to dedicate this short paper to Professor Seitaro Tsuboi who has encouraged me with an instruction that Japanese geologists and palaeontologists should contribute something

* Read Dec. 19, 1954; received Nov. 15, 1954.

new to the international scientific problems from the study of the material in the mother nature of Japan.

I acknowledge here my heartfelt thanks to Mr. C.W. WRIGHT who has helped my study in various ways and also to General M. COLLIGNON for his friendly correspondences. Thanks are due to Mr. W.N. EDWARDS, Keeper of Geology, and Dr. L.F. SPATH of British Museum (Natural History) who have afforded me facilities for studying there through the British Council Scholarship.

The Coniacian Forms of *Texanites*

COLLIGNON (1948) pointed out that typical *Texanites* with five rows of tubercles on the ribs do not appear until the middle part of the Coniacian, but that there are in the lower Coniacian certain quadrituberculate species. He separated the latter as *Paratexanites* (type species *Mortoniceras zeilleri* DE GROSSOUVRE, 1894). There are, however, other distinct Coniacian species in Europe and America with only three tubercles on each rib and these give a valuable clue to the origins of the family. They are here separated as:—

Protexanites nov.

Type species: “*Mortoniceras*” *bourgeoisi* (D'ORBIGNY) GROSSOUVRE (1894, p. 73, pl. xiii, fig. 2; pl. xiv, figs. 2-5).

Generic diagnosis:—Similar to *Texanites* in general aspect, especially in the shell-form, ventral keel and suture-line. Ribs are gently flexuous, arcuate or oblique (especially so near the periphery), sometimes dichotomous at the umbilical edge or with intercalated shorter ones; typically trituberculate, with umbilical, ventro-lateral and ventral tubercles and sometimes quadritubercu-

late in the later whorls with one lateral tubercles in addition to other three. The ventral tubercles are clavate (i.e. elongated longitudinally).

Remarks:—I refer to the proposed new genus, besides the type species*, *Mortoniceras bontanti* GROSSOUVRE (1894, p. 77, pl. xvii, fig. 2 only, holotype by original designation) and a probable new species represented by a paratype of ‘*M. bontanti* GROSSOUVRE’ (Ibid., pl. xvii, fig. 3) from the Coniacian of France and also *Mortoniceras canaense* GERHARDT with variety *oblique-costata* GERHARDT (1897, p. 73, pl. 1, fig. 2a-c; p. 76, text-fig. 2a) from South America. Furthermore *Peroniceras amakusense* YABE (1902, p. 5, pl. 1, fig. 1a, b), *Mortoniceras fukazawai* YABE & SHIMIZU (1925, p. 130 (6), pl. xxx (i), fig. 1; pl. xxxi (ii), figs. 1, 2, 6, 7; pl. xxxiii (iv), figs. 1, 2), which is probably synonymous with the preceding species, and *Mortoniceras nomii* YABE & SHIMIZU (1935, p. 131 (7), pl. xxxii (iii), figs. 1-3) from the Neourakawan (Santonian) of Japan are referred to the present genus. *Mortoniceras shoshonense* MEEK (1876, p. 449, pl. 6, figs. 3a, 3c, 6a; also REESIDE, 1907, p. 9, pl. 6, figs. 16-23; pl. 7, figs. 1-11; pl. 8, figs. 1-4) from the lower Cody shale (Upper Coniacian) and the poorly preserved *Mortoniceras strozzii* DESIO (1902, p. 204 (16), pl. xii (i), fig. 8) may perhaps be referable to the present genus.

Those species were mostly referred by COLLIGNON (1948) to *Texanites*. However *Texanites* should be confined to the

* I missed unfortunately an opportunity of visiting France and Germany to study the specimens of these species, but the description and illustration of GROSSOUVRE and GERHARDT are sufficiently clear and reliable.

group of species which are allied to the type species, *Ammonites texanus* ROEMER. *Texanites* thus revised has rather rectiradiate ribs and quinquetuberculate (except in very early growth-stage), tubercles being nearly equidistant in the lateral view.

A Possible Origin of Peroniceratidae

Protexanites, above defined, is of course intimately related to *Texanites* (s.s.) but is morphologically relatively less advanced and stratigraphically appears earlier. It is one of the earlier representatives of the Peroniceratidae. Looking at *Protexanites*, especially at its earlier members, *P. bourgeoisi*, *P. bontanti* and *P. canaense*, I cannot deny their striking resemblance to certain species of Upper Turonian *Subprionocyclus*, such as *S. neptuni* (GEINITZ) and *S. cristatus* (BILLINGHURST). The latter genus, which was revised by WRIGHT & MATSUMOTO (1954), has umbilical, ventro-lateral and ventral tubercles. The ventral tubercles are clavate. The ribs are rather flexuous or oblique, showing a forward bend at the periphery. They are frequently bifurcate or have intercalated shorter ones. These characters are more or less well retained in *Protexanites* and the only criterion for distinction is the more continuous keel in *Protexanites* in contrast to the serrated keel in *Subprionocyclus*. However we know that the keel tends to become more continuous in the outer whorl of certain *Subprionocyclus*, e.g. *S. hitchinensis* (BILLINGHURST), and it is somewhat wavy in some *Protexanites*.

Thus the derivation of *Protexanites* from *Subprionocyclus* is almost certain both on morphological and stratigraphical grounds. However the occurrence of *Protexanites* in the basal horizon of Coniacian has not yet been proved.

This weak point, though minor, should be consolidated in future.

It is also possible that *Subprionocyclus* leads to *Peroniceras*, if its clavate ventral tubercles also become more continuous. It could also give rise to *Paratexanites* COLLIGNON, 1948 (type species *Mortoniceras zeilleri* GROSSOUVRE), if one more pair of outer tubercles is added and the ribs are straightened. However I have failed to find a good example of intermediate forms.

Subprionocyclus is small or moderate in size and a rather unspecialized member of the Collignoniceratidae; its distribution is wide. It is more likely to have given rise to a new family than the more specialized forms, like *Collignonicerias* (= *Prionotropis*), *Prionocyclus*, etc. In fact, as WRIGHT & MATSUMOTO has indicated, *Reesidites* is a specialized end form derived from *Subprionocyclus* by loss of ventrolateral tubercles and acquisition of a compressed and involute shell-form.

Some Features in the Evolution of Peroniceratidae

As I have not observed a sufficient number of specimens of *Gauthiericeras* I hesitate to discuss the origin of it. It might be a derivative from some special member of Collignoniceratidae or it might be a parallel development with *Peroniceras*. Those two genera reach fairly large size, while *Yabeiceras* is rather small. I do not know where the type specimens of *Yabeiceras* are preserved, so I am unfortunately unable to say much on this Japanese form. However, from the description of TOKUNAGA & SHIMIZU, 1926 it seems to me a lateral offshoot running near *Peroniceras* and *Gauthiericeras*. All those genera are confined to the Coniacian.

Protexanites and *Paratexanites* appear in the Lower Coniacian and range up to the Lower Santonian. The earliest representative of *Texanites* (s.s.) is known in the Upper Coniacian (i.e. *T. pseudotexanus* (GROSSOUVRE)) and the genus is more common in the Santonian. According to COLLIGNON (1948) *Bevahites* (*Parabevahites*) also ranges from the Upper Coniacian to Lower Santonian.

Thus various genera of the Peroniceratidae developed rather suddenly in the Coniacian and a few of them evolved Santonian forms. Another epoch of specialization is in the Middle Campanian, when *Submorticeras* and *Menabites* (with its subgenera) flourished. However their distribution seems to be rather local and the development is not

so significant as in the Coniacian.

To clarify the details of the evolution of the Coniacian genera more careful zonal collection is necessary. I should like to give here some remarks on the two genera which flourished in the Santonian.

COLLIGNON regarded *Parabevahites* as a derivative of *Texanites* (in his definition) without showing a good evidence. I would regard *Parabevahites* as a direct derivative from *Paratexanites*. They are closely allied to each other; the difference is only in the distance between each two of three outer tubercles. Some may prefer to put *Parabevahites* in the subgenus *Paratexanites*. Anyhow *Paratexanites* is independent of *Texanites*.

Morticeras orientale YABE (YABE &

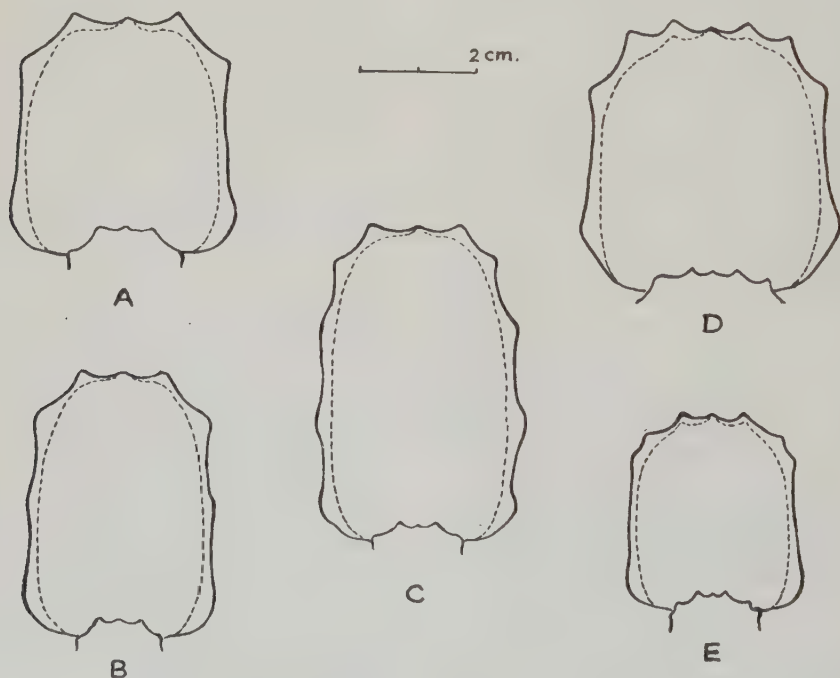


Fig. 1. Whorl sections of some Texanitids in the relatively late growth-stage. A. *Protexanites* (earlier form); B. *Protexanites* (later form); C. *Texanites*; D. *Paratexanites*; E. *Parabevahites*. The dotted line shows intercostal section. (T.M. del. adapted from the illustration of the typical species of each genus.)

& SHIMIZU, 1925, p. 129 (5), pl. xxxi (ii), figs. 4, 5; pl. xxxiii (iv), fig. 16) from the probable *Scaphites* bed (presumably its Coniacian part?) of Hokkaido was assigned to *Parabevahites* by COLLIGNON (1948) but it is a good example of *Paratexanites* in the definition of COLLIGNON. Its allied species, *Mortoniceras umkwelanense* CRICK (1907, p. 228, pl. xv, fig. 9, 9a), is not a *Texanites* nor *Bevahites* but a *Paratexanites* or an intermediate form between *Paratexanites* and *Parabevahites*. I fortunately studied the holotype (BM. C. 18134) (fig. 2) and have noticed an interesting fact. The distance between the ventral and "marginal" tubercles is in the outer whorl slightly shorter than that between the "marginal" and "submarginal" tubercles, but slightly longer in the inner whorl. Moreover in the visible earlier part of the inner whorl at diameters below 120 mm., the two peripheral tubercles tend to have a common base whereas they are separated from the clavate ventral tubercle by a somewhat deep depression.

Summarizing the above, the character of *Parabevahites* tends to appear in the inner whorl of this species, while its large outer whorl is rather of *Paratexanites* type. (We can ignore the weakening of the keel in the last portion as minor feature in regard to this problem.) *Paratexanites umkwelanensis* (CRICK) is thus morphologically very interesting, but unfortunately its exact date is doubtful.

Mortoniceras desmondi GROSSOUVRE (*Ammonites texanus* SCHLÜTER, 1867, p. 32, pl. vi, fig. 3 only), which was assigned by COLLIGNON to *Texanites* with a query, seems to me to be an early *Parabevahites* or an intermediate form between *Paratexanites* and *Parabevahites*. It is recorded from the boundary of Coniacian

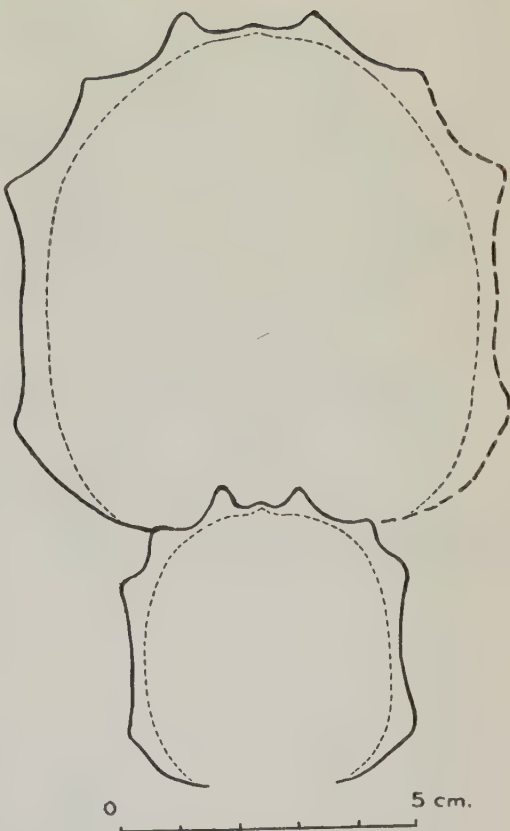


Fig. 2. Whorl section of *Paratexanites umkwelanensis* (CRICK) BM. C. 18134, Umkwelane Hill, Zululand, Africa. (T.M. del. by kind permission of Keeper of Geology, British Museum (Natural History)).

and Santonian or the top of the Coniacian.

The Upper Santonian-Middle Campanian *Bevahites* apparently resembles quadrituberculate later *Protexanites* but must be a parallel development, since it shows evidence of having developed through *Parabevahites* by unification of the two peripheral tubercles.

Whether *Texanites* (s.s.) is a derivative of *Paratexanites* or *Protexanites* is still uncertain. However the outer lateral (or "submarginal") tubercle in

Texanites is often, if not always, rather weak. *Protexanites* could lead to *Texanites* by straightening of ribs and addition of outer lateral tubercles. From this fact and from another fact which will be mentioned below I am inclined to regard *Protexanites-Texanites* series as parallel with *Paratexanites-Parabevahites-Bevahites* series.

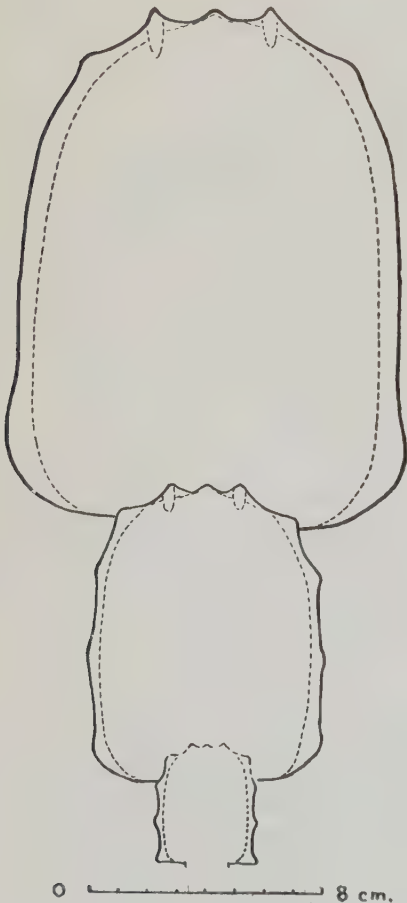


Fig. 3. Whorl section of *Texanites soutoni* (BAILY) BM. C. 47261, A cliff of the coast of S. Africa, near the Umtafuna and Umzambani River. (T. M. del. by kind permission of Keeper of Geology, British Museum (Natural History)).

The fact which I have noticed is found in *Ammonites soutoni* BAILY (1855, p. 453, pl. xi, fig. 1a-c), another African species. Its apparent resemblance to our "*Mortonicerias*" *fukazawai* and "*M.*" *nomii* had been stuck on my mind until I saw the specimens of that species. The type specimen illustrated by BAILY (BM. C. 47261) (fig. 3) is a very large example with a diameter of 475 mm. Its inner whorl below a diameter of about 100 mm. shows the typical character of *Texanites* with the prominent three equidistant tubercles which are visible on the lateral side, besides the two outer ones overlapped by the outer whorl; the ribs are nearly rectiradiate with occasional intercalation or branching. The quinquetuberculate ornamentation continues up to a diameter of about 300 mm., where the last septum is found. However the two lateral tubercles are weakened as the shell grows on. On the body whorl the two lateral tubercles are almost completely lost while the ribs themselves are very strong and, on the unweathered part, especially where the test is preserved, the umbilical, ventrolateral and clavate, ventral tubercles are also fairly strong. Moreover the ribs show a gentle flexuosity on the outer whorl.

Thus the species in question is a typical *Texanites* in its inner whorls and shows clear characters of *Protexanites* in its adult body whorl. In other words, as in the previous example, *Texanites* seems to be caenogenetically evolved from *Protexanites*. It is a matter of convention to refer the species in question to *Texanites*, admitting it as a sort of an intermediate form between the two genera.

We know another species of more typical and large *Texanites*, *T. stangeri* (BAILY), occurring in the same area of

T. soutoni (BAILY). Unfortunately there is no record of zonal collections in Southeast Africa but the two species have been regarded as coming from the same horizon, associated with *Hauericeras gardeni* (BAILY) and *Pseudoschloenbachia umbulazi* (BAILY) (e.g. SPATH (1922)).

In the Japanese province *Protexanites nomii* (YABE & SHIMIZU) (including the specimens in subsequent collections) occurs in the Neourakawan (Santonian), where *Hauericeras gardeni* is common. "*Peroniceras*" *amakusense* YABE came

from the probable Santonian of Amakusa, Kyushu. Examining the holotype it is not a *Peroniceras* but a crushed *Protexanites* and very probably an immature *Protexanites fukazawai* (YABE & SHIMIZU). The large specimens of the latter came from Oda-Mura, Uto, Kumamoto Prefecture. As there is *Inoceramus japonicus* in the same area the fossiliferous horizon of Oda-mura is correlated with the Neourakawan. In Hinoshima islet of Amakusa I have collected a large *Texanites* which is comparable to *T. oliveti* (BLANCKENHORN). As the oc-

EVOLUTION OF PERONICERATIDAE

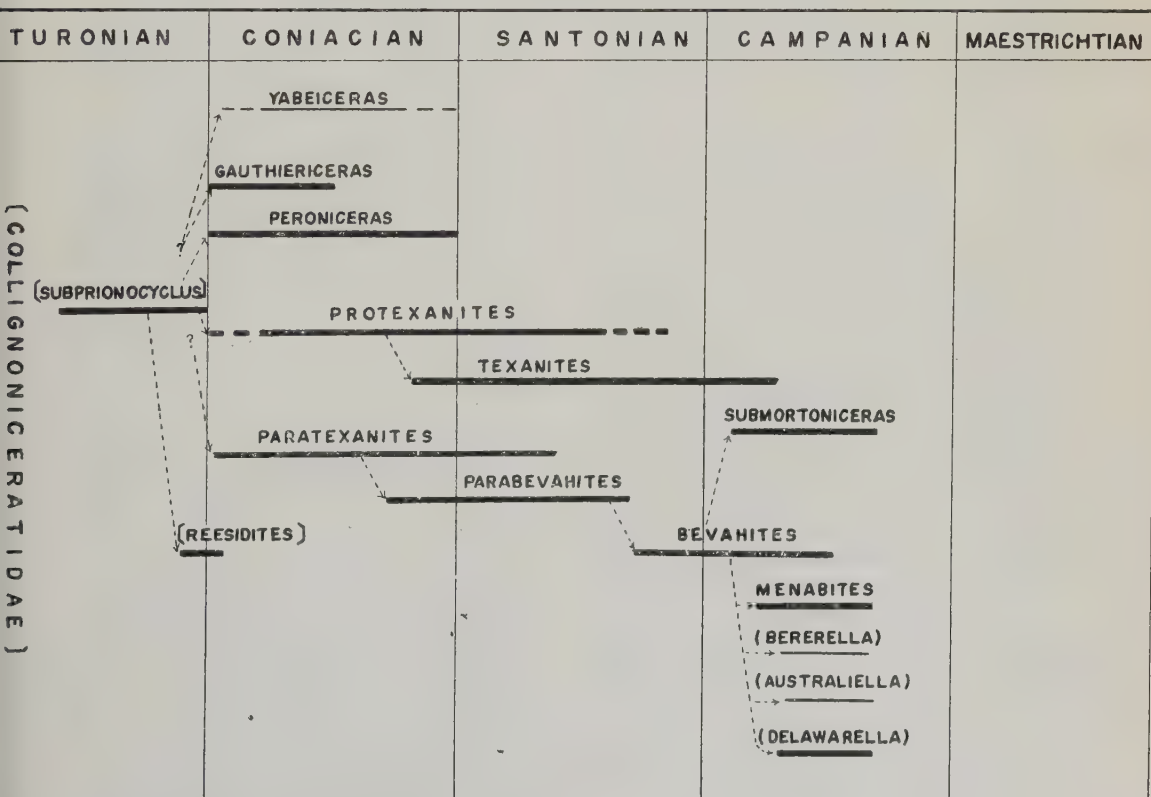


Table I. Evolution of Peroniceratidae.

Thick line: range of genera of relatively wide distribution;

Thin line: range of genera or subgenera of local distribution.

The genera of Collignoniceratidae mentioned in the text are in bracket []. The dotted line with an arrow shows the presumed course of evolution.

currence of these forms are rather sporadic, the zonal examination is again difficult. They occur in the Neourakan, if not at the same horizon.

Although I know an undescribed specimen of a *Parabevahites*-like form occurring in the Santonian of Hokkaido, true Campanian Peroniceratids have not yet been found in Japan and South Saghalien. The so-called *Submortonicerat* in the list of SHIMIZU (1935) is not warrantable in the generic and stratigraphic assignment.

Finally I present here a range chart of the genera and subgenera of Peroniceratidae with a supposed line of evolution. It depends much on Gen. M. COLLIGNON's work and Mr. C.W. WRIGHT's personal communication but is modified by my own opinion.

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266. *HIDAELLA*, A NEW GENUS OF THE PENNSYLVANIAN
FUSULINIDS FROM THE FUKUJI DISTRICT, EASTERN
PART OF THE HIDA MOUNTAINLAND,
CENTRAL JAPAN*

HARUYOSHI FUJIMOTO and HISAYOSHI IGŌ

Tokyo University of Education

飛騨山地福地附近のペンシルバニア系より産する紡錘虫の新属 *Hidaella*: 飛騨山地福地附近に産する一の谷石灰岩から紡錘虫の一新属を発見したので、*Hidaella* と命名し、ここに報告する。本属は *Fusulinella* によく似ているが、殻壁が強く褶曲している点から区別できる。模式種 *Hidaella kameii* は一の谷石灰岩中部に豊富に産し、*Fusulina* 属と共存する。 藤本治義・猪郷久義

Recently, the writers discovered some interesting fusulinids in the Ichinotani Group which is distributed near Fukuji, Kamitakara Village, Yoshiki District, Gifu Prefecture. The materials were collected from a black impure limestone of the lower division of the Ichinotani Group developed at the Ichinotani and the Mizuboradani valleys.

The Ichinotani Group is divided into the following two lithological units, (1) Lower or Ichinotani limestone; (2) Upper or alternation of sandstone and shale intercalating conglomerate. The Ichinotani limestone yields a rich fauna consisting of fusulinids, smaller foraminifers, corals and gastropods. From the evidence of these fossils, the limestone is inferred to correspond to the highest Morrowan? to the basal Permian.

The specimens here considered as representing a new genus can be distinguished from its allied forms principally by the irregular undulation of its spiro-

theca, which is undulated both meridionally and equatorially. The spirotheca is composed of a tectum, upper and lower tectoria and a diaphanotheca. In the general shape of the shell and the irregular undulation of the spirotheca the present type resembles *Rugosofusulina* RAUSER-CERNOUSSOVA, from which it is distinguished by the lack of a keriotheca. The present type also resembles *Fusulinella* MÖLLER, but is distinguishable therefrom by the irregular rugose spirotheca. This type is believed to be an aberrant descendant of the genus *Fusulinella*, referable to no known genus, and in need of a new generic name for which *Hidaella* is proposed. The phylogenetic position of *Hidaella* is referred to the subfamily Fusulininae.

Genus *Hidaella* FUJIMOTO and IGŌ,
new genus

Genotype:—*Hidaella kameii* FUJIMOTO and IGŌ, new species.

Diagnosis:—Shell rather small, elongate fusiform to subcylindrical; central portion

* Read Oct. 9, 1954; received Nov. 24, 1954.

slightly inflated or straight; polar regions broadly rounded; mature specimens with about five volutions. Axial length, 2.4 to 3.2 mm., median width, 0.87 to 1.3 mm.; axial ratio, about 1:3.0 in last volution. First two to three volutions tightly coiled, axis of coiling short, subspherical or slightly quadrangular in shape; outer volutions rather inflated, proloculus minute; generally spherical. Spirotheca composed of thin and dense tectum, less dense upper and lower tectoria and diaphanotheca; irregularly and highly undulated throughout. Septa numerous, thin and complicately folded in polar regions. Tunnel singular with regular or irregular path, narrow to broad tunnel angle; chomata massive and of moderate height. Axial filling lacking.

Remarks:—*Hidaella* resembles *Fusulinella* in several respects, especially in the inner volutions possessing a short axis of coiling, spirothecal structure, massive chomata, and in the septal fluting. The irregular undulation of the spirotheca of *Hidaella* removes it from *Fusulinella* and suggests that it may be an aberrant descendant of the latter. The undulation of the spirotheca has been reported in some fusulinid genera as *Rugosofusulina* RAUSER-CERNOUSOVA, which may be distinguished from *Schwagerina* MÖLLER by the rugose spirotheca; their inner characters, however, are much alike. *Hidaella* resembles the genotype of *Rugosofusulina*, but differs therefrom by the spirothecal structures. *Hidaella* from its structural features is referred to the subfamily Fusulininae, while *Rugosofusulina* belongs to the Schwagerininae.

Hidaella kameii FUJIMOTO and
IGŌ, new species

Pl. 7, Figs. 1-10.

Shell rather small, subfusiform to subcylindrical; central portion slightly inflated or straight; polar regions broadly rounded; mature specimens with about five volutions, axial length 2.4 to 3.4 mm., median width 0.87 to 1.3 mm.; axial ratio 1:2.5 to 1:3.5 in last volution.

First two to three volutions closely coiled, their heights increase slowly, with short axis of coiling, subspherical or slightly quadrangular in shape; outer volutions generally rather inflated, elongate fusiform to subcylindrical; uncommonly loosely coiled and irregular (Fig. 8); axial ratio of first to last volutions in holotype, 0.83, 1.0, 1.3, 1.7, 1.9, and 2.8, respectively; proloculus very minute, about 0.07 mm. in diameter, generally spherical, but sometimes subellipsoidal.

Spirotheca thin, thickness gradually increasing from inner to outer, composed of thin and dense tectum, less dense upper and lower tectoria and a transparent diaphanotheca. Diaphanotheca developed on inner ones to three volutions. Lower tectorium of last volution usually indistinct. Average thickness of spirotheca of first to last volution in holotype and two paratypes are 7, 11, 13, 17, 26, and 15 microns.

Septa numerous and thin; septal folding strong and irregular in polar regions, but feeble in central portions.

Tunnel singular with regular or irregular path, tunnel angle narrow to broad and measures 26, 31, and 52 degrees in inner two to four volutions, respectively in holotype; chomata distinct throughout shell, massive, of moderate height, their tunnel side and poleward slope generally steep, but the latter may be low. Axial filling quite absent.

Remarks:—In the general size of the shell, axial ratio, spirothecal structure, septal flutings, and development of the chomata, *Hidaella kameii* resembles

Fusulinella fluxa LEE and CHEN more closely than any other species of the genus *Fusulinella*. The former can be distinguished from the latter by its highly irregular undulation of the spirotheca and small cylindrical shell.

Type locality and geological horizon :—Fukuji, Kamitakara Village, Yoshiki District, Gifu Prefecture. Ichinotani limestone (middle part). Preserved in the Collection of the Geological and Mineralogical Institute, Faculty of Science, Tokyo University of Education. Reg. No. 20101 (Holotype) 20100, 20102, 20103, 20104, 20105, 20106, 20107, 20108, 20109, 20110 (Paratype). Zone of *Fusulina*.

Occurrence :—This species is common in the middle part of the Ichinotani limestone where it is associated with *Ozawainella angulata* (COLANI), *Fusiella typica* LEE and CHEN, *F. paradoxa* LEE and CHEN, *Pseudostaffella spheroides* (MÖLLER), *Fusulina lanceolata* (LEE and CHEN), *F. schellwieni* (STAFF), and *F. ichinotaniensis*, new species. From fossil evidence it is clear that the faunal

assemblage is a representative of the Zone of *Fusulina* as recognized in North America and in Kyushu, Japan.

Previously the Zone of *Fusulina* was not well established in Asia, but from recent discoveries, its existence has become a recognized fact in not only Kyushu but also the Hida mountainland.

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Explanation of Plate 7

Figs. 1-10. *Hidaella kameii* FUJIMOTO and IGŌ, new species. All figures enlarged 20 times.

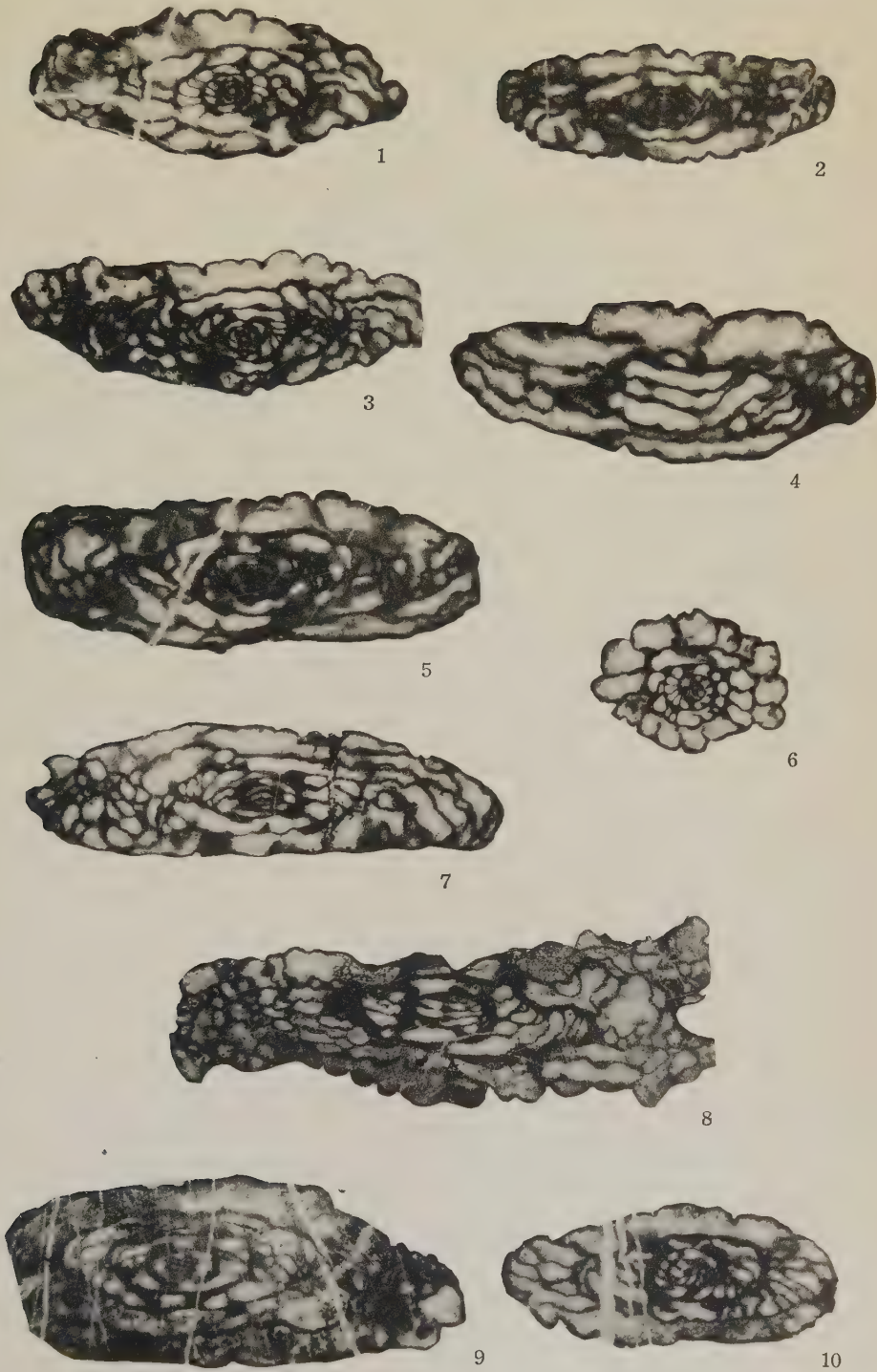
Figs. 1, 3, 5. Axial sections of paratypes. Reg. no. 20100, 20102, 20103, respectively.

Fig. 2. Axial section of the holotype. Reg. no. 20101.

Figs. 4, 7, 8, 9, 10. Tangential sections of paratypes. Reg. no. 20110, 20108, 20104, 20109, 20111, respectively.

Fig. 6. Parallel section of a paratype. Reg. no. 20107.

(All of the specimens are deposited in the collection of the Tokyo University of Education).



267. *SPIROSIGMOILINELLA*, A NEW FORAMINIFERAL GENUS FROM THE MIOCENE OF JAPAN

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日本の中新世から産出した有孔虫の新属 *Spirosigmoilinella*:—裏日本の中新世から多数産する有孔虫の新属, 新種 *Spirosigmoilinella compressa* MATSUNAGA を記載し, 且現在迄の資料では此の新種が中新世の中下部に限って産出する事実をあげた。 松永 孝

Introduction

Investigations of the Miocene sediments of Hokkaido and North Honshu, Japan, as an important project in petroleum exploration, have led to the necessity of paleontological evidence for correlation purposes. Continued laboratory work on the Foraminifera contained in boring cores and obtained from surface exposures, revealed the presence of a peculiar type, which is thought to have important bearing on the problem.

The peculiar type, which is believed to represent a new genus, was first discovered among surface samples obtained from Kugami, Kugami-mura, Nishikanbara-gun, Niigata Prefecture, by Mr. Shogo TAKAHASHI, then a geologist of our company. Subsequently, this genus has been found to occur abundantly in the Miocene sediments in North Honshu, although its presence in the Miocene rocks of Hokkaido has not yet been proven. The distribution in sediments of Miocene age of this genus seems to indicate that it is important both stratigraphically and paleoecologically.

Acknowledgements

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Family Silicinidea

Subfamily Rzehakininae

Genus *Spirosigmoilinella* MATSUNAGA,
n. gen.

Genotype:—*Spirosigmoilinella compressa* MATSUNAGA, n. sp.

Description:—Test in early stage similar to *Silicosigmoilina*, but diverging therefrom in adult stage by developing chambers in a single plane; chambers compressed, wall finely arenaceous, with siliceous cement; aperture at end of chamber, rounded, with short neck, and without a tooth.

Remarks:—This new genus can be distinguished from *Silicosigmoilina* by the development of spiroloculine chambers in the adult stage, and from *Spirosigmoilina* by the presence of a siliceous

* Read June 26, 1954; received Nov. 6, 1954.

test, that is, by the characters of their shells.

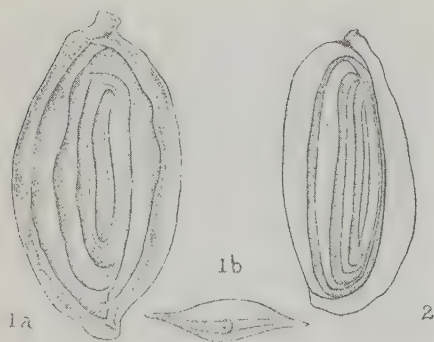
Geological range:—Lower to Middle Miocene, Japan.

Spirosigmoilinella compressa

MATSUNAGA, n. sp.

Text-figs. 1-2

Description:—Test strongly compressed, about twice as long as broad, periphery subangular; early chambers sigmoidal, later ones spiroloculine; suture often indistinct; wall finely arenaceous with siliceous cement; aperture at end of chamber, rounded, with a short neck and no tooth.



Text-figs. 1-2

Spirosigmoilinella compressa MATSUNAGA,
n. gen., n. sp. $\times 51$

1a, b. Holotype, Teradomari Formation, Niigata Pref., Japan. 2. Young specimen, Teradomari Formation, at a depth of 856.0 m. in the Teikoku Oil Company's Tanaka R-5, Tanaka, Nishigoshi-mura, Santo-gun, Niigata Pref., Japan.

Dimensions:—Maximum length of holotype 0.59 mm. Paratypes range in length

from 0.37 mm to 0.71 mm.

Locality and geological age:—From the upper part of the Teradomari formation (Middle Miocene) at a depth of 844.8 meters in the Teikoku Oil Company's Yahiko R-2, 80 meters east of Yahagi, Yahiko-mura, Nishikanbara-gun, Niigata Prefecture, Japan. Holotype (TOC. Pal. Coll. Cat. No. 601451). Deposited in the collection of the Paleontological Laboratory, Teikoku Oil Company, Tokyo, Japan.

Occurrence:—Besides the type locality above mentioned, the genus is found in the following formations: Teradomari and Nanatani formations in Niigata Prefecture. Lower part of the Kitamata and Upper part of the Aosawa formations in the Shonai district, Yamagata Prefecture. Funakawa and Onnagawa formations in Akita Prefecture. Up to the present time, the genus has not been found in horizons younger than the formations afore-mentioned. Although it has not yet been found in Hokkaido, its occurrence is expected.

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PROCEEDINGS OF THE PALAEONTOLOGICAL
SOCIETY OF JAPAN

「日本古生物学会 1954 年年会」1954 年 12 月 19 日
東京大学理学部地質学教室に於いて開催した（参
会者 64 名）。

年会に於ける講演者並びに講演題目は次の通り
である。

化石珪藻の電子顕微鏡的微細構造 III（代読）

北部九州芦屋層群中の有孔虫 奥野春雄

サルポー貝の進化について 村田茂雄

計測的見地より見たる腕足類 *Terebratalia cor-*

eanica の mutation について 古藤次郎

Peroniceratidae の進化史 松本達郎

貝化石より見た応用古生物学上の二・三の問題

欧米旅行談—Nebraska, Wyoming, Colorado,

New Mexico における含哺乳類古第三系を

中心として一 高山冬二

シンポジウム「日本第三系微化石層位学」

世話人の挨拶 浅野清

秋田油田の 2 地域における微化石層位区分と

その検討 岩佐三郎

油田第三系微化石層位学の現状 松永孝

房総半島を中心とした微化石層位学 他 4 名

石和田靖章

「日本古生物学会第 60 回例会」1955 年 2 月 12 日
九州大学理学部地質学教室に於いて開催した（参
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石狩炭田美唄炭中の単子葉植物花粉について

（代読） 徳永重元

小崎層の紡錘虫化石 勘米良亀齡

Trigoniidae from Jurassic of Soma in Pro-

vince Iwaki, Japan（代読）

Teiichi KOBAYASHI and Minoru TAMURA

Some New Species of the Myophorellinae

from Central and West Japan（代読）

Teiichi KOBAYASHI

The Bituberculate Pachydiscids from Hok-

kaido and Saghalien Tatsuro MATSUMOTO

日本地質学地理学集報投稿規程

日本地質学地理学集報編集委員会(委員長 小林貞一)では去る 4 月 2 日の会合で投稿規定を下記の様に決定した。

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H. KATO (1941) described the fossils from.....

YAMAMOTO (1940a) summarized the knowledge of.....

These rocks were named the Sinano volcanic series (YAMAMOTO, 1940b, p. 102)

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日本古生物学会 例会通知

	開催地	開催日	講演申込〆切日
第 61 回 例 会	京 都	6 月 18 日	5 月 31 日
第 62 回 例 会	東京(教育大)	10 月 29 日	9 月 20 日
総 会	仙 台	1956年1月未定	12 月 10 日

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